

REMARKS

In accordance with the foregoing, claims 11 and 28 have been amended. Claims 11 and 13-28 are pending and under consideration.

The sole issue remaining in this application is an obviousness rejection of claims 11 and 13-28 under 35 U.S.C. §103(a) as being obvious over U.S. Patent Publication No. 2003/0069024 to Kennedy in view of U.S. Patent Publication No. 2004/0152471 to MacDonald et al.

Kennedy et al. relates to a method for geolocating a wireless mobile unit from a single base station. Paragraph [0023] of Kennedy summarizes this process as follows:

[0023] It is yet a further additional object of the present invention to provide a novel system and method for geolocating a mobile unit from a single base station by measuring certain parameters of the communication signal and pilot signal data of the mobile unit to thereby identify an ambiguous position estimate, compare the ambiguous position estimate with a database of reference ambiguous estimates to thereby determine the geolocation of the mobile unit without having to calculate the geolocation from a mathematical expression containing the measured parameters.

Kennedy describes the process in more detail in paragraphs [0041] and [0042] as follows:

[0041] The time delay equipment 115 is used to determine a range from the base station to a mobile unit. The result is a range ring about the base station. The range ring is a locus of possible locations for the mobile unit based solely on the determined range from the base station. Once a call initiation from a mobile unit is detected, the time delay equipment makes a ranging estimate by known methods. One method would include synchronizing with GPS time and measuring reverse traffic channel signaling to estimate range. Another method would include measuring a two-way ranging by comparing the time of transmitting a message on a forward channel to the time of receipt of a responding message on the reverse channel.

[0042] The differential phase equipment 116 is used to determine a phase difference of a reverse traffic waveform as it is received by the randomly-located antennas at the base station. The randomly-located antennas are typically antennas that already existed at the base station prior to adding the geolocation overlay equipment and are random in the sense that the antennas are not spaced at calibrated intervals. Since the differential phase measurement being taken uses these randomly-located antennas, the resulting lines of bearing are an ambiguous set of possible radial lines of location from the base station. However, the differential phase measurements are repeatable, a property which the present invention exploits. This technique is different than the aforementioned techniques for direction finding using a calibrated array of antennas. The technique of the present invention yields an ambiguous solution whereas the aforementioned direction finding techniques yield a unique solution for differential phase measurements and that unique solution is used to solve a geometric calculation to locate the mobile unit. The technique of the present invention uses the repeatability of the ambiguous differential

phase measurements to compare the real-time measurements taken from a mobile unit with a set of reference measurements as will be described below.

Although not entirely clear, it appears that Kennedy determines an ambiguous position estimate based on signal propagation times. Perhaps this ambiguous position estimate determines the radial distance of the mobile station from the base station.

Kennedy also uses phase delay measurements between randomly located antennae. In Kennedy, it appears that a geometric calculation is avoided by using a look-up table. Perhaps the look-up table includes the phase delay measurements previously achieved at known-GPS positions.

Any timing information in the lookup table is useless if it is compared with the measured timing information therefore a sensible comparison is when the received signal strength is used for looking up in a data table with data based on drive tests which stored the received signal strength and the location determined via a GPS system in this data base. The retrieval and storage of the data through drive tests is not discussed in the reference but is a standard method in the industry. Kennedy talks always about just one measurement whose values are used for the geolocation at this moment in time. There is no storing of data prior to the determination of the geolocation of the mobile station.

Further in paragraph [0042] (at the end) Kennedy mentions the repeatability of the differential phase measurement but these measurements are not stored. They are on-line and fed straight into the comparison block (118) in Figure 3 (paragraph [0043]).

The Examiner argues that it would have been obvious for Kennedy to store reports in advance. However, as mentioned throughout the reference, Kennedy relies on just a single base station. This is why Kennedy also refines the rough location using phase delay measurements and what appears to be a look-up table. If Kennedy stored a plurality of reports in advance, it is questionable what use these earlier reports would have. Perhaps the earlier reports could be averaged with the most recent reports. However, this would increase complexity and decrease accuracy in the position estimate. That is, an average past position would be determined, not a current position. On the other hand, as reflected by the amended claims, and is described in paragraph [0006] of the application, the present invention has an important need for these reports. Neither MacDonald nor any other reference would suggest modifying the Kennedy method to store reports in advance. It is therefore submitted that the rejection should be withdrawn.

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There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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